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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,991	11/14/2001	Brian J. Moore	29250/CE08644R	8827
22917	7590	05/05/2006	EXAMINER	
MOTOROLA, INC. 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			STEELMAN, MARY J	
			ART UNIT	PAPER NUMBER
			2191	

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/993,991	MOORE ET AL.	
	Examiner	Art Unit	
	Mary J. Steelman	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to Amendments and Remarks, filed with an RCE received 04/12/2006. Per Applicant's request, claims 1, 6, 11, 14, and 15 are amended. Claims 1-15 are pending.

Response to Arguments

2. Applicant has argued, in substance, the following:

(A) Referring the Holte-Rost reference, (as noted on page 12, 2nd paragraph) "the old release and the new release of software are active and running at the same time, such that both...have operational control of the system at the same time.

Examiner's Response: New art has been applied in the rejection that explicitly recites that only one 'release' is actively in control at a time.

(B) As noted on page 14, 3rd paragraph, Holte-Rost does not disclose the conversion of the state data for a downgrade.

Examiner's Response: New art has been applied in the rejection that explicitly discloses converting state data as necessary.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4-6, and 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,101,327 to Holte-Rost et al., in view of US Patent 6,463,584 B1 to Gard et al.

Per claim 1:

A checkpointing method of stabilizing a wireless communication systems during an upgrade of services, the wireless communication system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

(Holte-Rost: Col. 4, lines 31-33, "The method ...provides means to synchronize (checkpointing) the state transfer of static processes within the old to the new version (upgrade) of software", col. 5, lines 40-41, "...to be used in a SPC (stored program control / controllers) telecommunications exchange system...", col. 6, lines 1-3, "The software that is most frequently replaced or upgraded ...ISDN, GSM (global system for mobile communications/ wireless) . . . ")

-operating the first version of a control application by the primary controller so that the primary controller has operational control of the wireless communication system;

Art Unit: 2191

(Holte-Rost: Col. 6, lines 11-12, "...normal traffic runs on the old version of software." See FIG. 5, process executing in old software)

-saving state data..., wherein the state data is representative of a stable operation of the wireless communication system,

(Holte-Rost: Col. 7, lines 4-8, "...the old software will by means of that signal be aware. . . and prepares for the. transfer of states (save state). The old static process publishes or activates an application defined interface for transferring the state... ")

-wherein the . . . state data is compatible with the first version of a control application;

(Holte-Rost: Col. 7, lines 6-8 & 12-13, "...old software static process publishes or activates an application defined interface (compatible interface for state data) for transferring the state ...With publication is meant defining (compatibility) the way the process communicates with other processes... ", "The old static process may also inform neighboring processes (compatibility) . . . about a forthcoming termination...")

-utilizing the checkpointing service to save the first format of the state data to the secondary controller;

(Holte-Rost: Col. 9, lines 28-32, "Before the upgrading procedure starts traffic will run as normal on the old software ...the old static process is informed about the forthcoming termination due to system upgrade with the operation PrepareShutdown (checkpointing service), after which the

Art Unit: 2191

application activates or publishes the interface for state transfer (save state and prepare to transfer to secondary processor)...)

-upgrading the replicated first version of a control application on the second controller to create an upgraded second version of a control application;

(Holte-Rost: Col. 6, lines 20-21, "The software to be replaced is referred to as a change unit", col. 6, lines 34-36, "Thereafter all 'new' traffic initiated after the test traffic has come to an end will be handled by the new software (upgrade to the second version) ."

-quiescing the primary controller,

(Holte-Rost: Col. 8, lines 2-4, "After the CommitShutdown signal has been given all traffic will be handled by the new version...")

-operating the upgraded second version of a control application on the second controller after quiescing of the primary controller...;

(Holte-Rost: Col. 8, lines 6-11, "...the new process now is the sole owner of the resource objects ...This is indicated by the CommitTakeover signal ...when the system upgrade function is committed...")

-converting the saved first format state data to a second format of the state data, wherein the second format of the state data is compatible with the upgraded second version of a control application...;

Art Unit: 2191

(Holte-Rost: Col. 7, lines 42-44, "the static processes within the new software are ordered to claim all resource objects of the static processes within the old software with a Takeover signal (all saved state is transferred to the new version)", col. 6, lines 30-35, "The new change unit (new version) is by definition chosen to have an interface that is compatible.. . the unchanged software (old version) is able to cooperate with both the old and the new software version (change unit)" The interfaces handle format compatibility.)

-operating the upgraded second version of a control application to control the wireless communication system,

(Holte-Rost: Col. 8, lines 6-10, CommitTakeover signal ...upgrade function is committed (second version of control application controls system). . . ")

-wherein the second version utilizes the converted second version of the state data to ensure wireless communication stability.

(Holte-Rost: Col. 8, lines 6-8, "the new process (second version) now is the sole owner of the resource objects (converted state data) previously claimed from the old process.", col. 3, lines 56-59, "Principal requirements satisfied by the smooth software change techniques with state transfer of the present invention include minimal or no user disturbance and a high level of system availability (ensure stability)."

Holte-Rost failed to disclose specifically the following features:

Art Unit: 2191

-a "first format" and a "second format" for the saved state, "so that the second controller assumes operational control of the wireless communication system upon quiescence of the primary controller", "as the second controller assumes operational control of the wireless communication system upon quiescence of the primary controller"

However, Gard explicitly disclosed FIG. 6(b) and text at col. 3, lines 44-47, state data is copied and converted from a first format to a second format, as necessary, to prepare for a switch to a second process controller, as the primary, first controller is quiesced. Col. 2, lines 3-18, "the system to be upgraded is divided into two logical partitions...old software that performs ordinary execution...new software...in the standby partition is updated to the same state...by copying data from the executing partition...data may have to be converted into a representation suitable for the new software." Col. 2, lines 32-39, "Thus, according to the present invention, the switch over from the old software to the new software requires that the complete state as represented in all data of the old software is copied and, if necessary, simultaneously converted, to the new software. Thus according to the present invention it is possible to continue execution of the new software with no disturbance at all."

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost's invention, by including the teachings of Gard, because both inventions are related to the wireless communications industry (assignee Telefonaktiebolaget LM Ericsson), both disclose techniques for a stable transfer of processing from a primary processor to a secondary processor. Holte-Rost did indicate that state was saved and using a synchronizing

Art Unit: 2191

interface that enforced compatibility, state was transferred to the new version. Col. 4, lines 38-48, "PrepareShutdown, . . prepares the application.. . After receiving the... signal the static process in the old software publishes or activates an application specific interface for the transfer of resource objects (states). A resource object is an object type whose main purpose is to handle information on a hardware resource or an internal data structure..." Gard recognized the need for (col. 1, lines 53-56) "updating software with minimum disturbance and scaleable down to virtually no disturbance at all. Likewise, Holte-Rost understood the need to (col. 3, lines 19-25) "change software, including state transfer of processes from the old to the new software, during actual operation of the telecommunications switch without disrupting..."

Per claim 4:

A method as defined in claim 1, wherein the wireless communication system comprises a network element.

(Holte-Rost: FIG. 2, col. 5, lines 20-21, "shows the system architecture in a general telecommunications system." GSM is global system for mobile communications (wireless). Col. 5, lines 41-47, A general telecommunication system, including a switch, distributed processors (network elements)... the switch is connected to one or more processors...")

Per claim 5:

A method as defined in claim 4, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center (MSC), a

Art Unit: 2191

Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN) , a Node B, and a mobile unit.

(Holte-Rost: FIG. 2, col. 5, lines 20-21, "shows the system architecture in a general telecommunications system." GSM is global system for mobile communications (mobile unit).

Col. 5, lines 41-47, A general telecommunication system, including a switch (mobile switching center / gateway switching node)), distributed processors (network elements) ...the switch is connected to one or more processors...")

Per claim 6:

A checkpointing method of stabilizing a wireless communication systems during a downgrade of services, the wireless communication system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

- operating the first version of a control application by the primary controller so that the primary controller has operational control the wireless communication system;
- saving state data in a first format, wherein the state data is representative of a stable operation of the wireless communication system, and wherein the first format of the state data is compatible with the first version of a control application;
- utilizing the checkpointing service to save the first format of the state data to the secondary controller; -downgrading the replicated first version of a control application on the second controller to create a downgraded second version of a control application;

Art Unit: 2191

- converting the saved first format of the state data to a second format of the state data, wherein the second format of the state data is compatible with the downgraded second version of a control application;
- quiescing the primary controller;
- operating the downgraded second version of a control application on the second controller after quiescing the primary controller so that the second controller assumes operational control of the wireless communication system upon quiescence of the primary controller;
- operating the second version of a control application so that the primary controller has operational control the wireless communication system, saving state data in a first format, wherein the second version utilizes the converted state data to ensure wireless communication stability.

The limitations of claim 6 are similar to claim 1 except that claim 6 calls for a downgrade as compared to an upgrade as claimed in claim 1.

Holte-Rost does not necessarily address the direction of version change, whether upgrading or downgrading (reverting to a former process), only the fact that as a process is changed from one to another, and that the state is synchronized (col. 4, line 32-col. 5, line 12) using various operations.

Art Unit: 2191

However, Gard, more explicitly disclosed a 'downgrade' (switch back) at col. 3, lines 1-10. A 'switch back' is performed and may include data copy, if necessary convert, in the same was as the switch over procedure.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost's invention, by including the teachings of Gard, because both inventions are related to the wireless communications industry (assignee Telefonaktiebolaget LM Ericsson), both disclose techniques for a stable transfer of processing from a primary processor to a secondary processor. Holte-Rost did indicate that state was saved and using a synchronizing interface that enforced compatibility, state was transferred to the different version. Col. 4, lines 38-48, "PrepareShutdown, . . prepares the application.. . After receiving the.... signal the static process in the old software publishes or activates an application specific interface for the transfer of resource objects (states). A resource object is an object type whose main purpose is to handle information on a hardware resource or an internal data structure..." Gard recognized the need for (col. 1, lines 53-56) "updating software with minimum disturbance and scaleable down to virtually no disturbance at all. Likewise, Holte-Rost understood the need to (col. 3, lines 19-25) "change software, including state transfer of processes from the old to the new software, during actual operation of the telecommunications switch without disrupting..." Downgrading is a software change, and using the techniques disclosed above may be done with minimal disturbances.

Per claim 9:

Art Unit: 2191

A method as defined in claim 6, wherein the wireless communication system comprises a network element.

(See rejection of limitations as addressed in claim 4 above.)

Per claim 10:

A method as defined in claim 9, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center (MSC), a Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN), a Node B, and a mobile unit.

(See rejection of limitations as addressed in claim 5 above.)

Per claim 11:

An apparatus for ensuring wireless communication stability during an update of a wireless communication system, the apparatus comprising:

- a first computer processor running a first version of control software, the first computer processor further having a first database capable of saving state data in a first version format representative of steady state operation;
- a second computer processor running a second version of control software, the second computer processor further having a second database capable of receiving the state data from the first database in a second version format to replicate the steady state operation of the first computer processor wherein the second computer processor running the second version of control software after the first computer processor has quiesced running the first version of control software;

Art Unit: 2191

-a checkpointing service to transfer the steady state data from the first database to the second database;

-a control block to translate the steady state data from the first version format to the second version format as the second computer processor assumes operational control of the wireless communication system upon quiescence of the primary controller.

Claim 11 is an apparatus version of claim 1. Holte-Rost: FIG. 2 shows the system architecture (apparatus) in a general telecommunications system Col. 5, lines 39-47, "...used in a SPC telecommunications exchange system (apparatus)..." Claim 11 also requires database storage.

Holte-Rost disclosed storage at col. 3, line 39-41, "...transaction oriented software together with a memory capable of storing (database) both old and new software version at the same time. The rejections, as addressed in claim 1, apply to claim 11.

Per claim 12:

An apparatus as defined in claim 11, wherein the wireless communication system comprises a network element.

(See rejection of limitations as addressed in claim 4 above.)

Per claim 13:

An apparatus as defined in claim 12, wherein the network element is an element selected from the group consisting of a Base Transceiver Station (BTS), a Mobile Switching Center (MSC), a

Art Unit: 2191

Base Station Controller (BSC), a Centralized Base Station Controller (CBSC), a Radio Network Controller (RNC), a Gateway Switching Node (GSN), a Node B, and a mobile unit.

(See rejection of limitations as addressed in claim 5 above.)

Per claim 14:

A checkpointing method of stabilizing a system during an upgrade of services, the system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

- operating the first version of a control application by the primary controller so that the primary controller has operational control of the system;
- saving state data in a first format, wherein the state data is representative of a stable operation of the system, and wherein the first format of the state data is compatible with the first version of a control application;
- utilizing the checkpointing service to save the first format of the state data to the secondary controller,
- upgrading the replicated first version of a control application on the second controller to create an upgraded second version of a control application;
- quiescing the primary controller;
- operating the upgraded second version of a control application on the second controller after the quiescing of the primary controller so that the second controller assumes operational control of the system;
- converting the saved first format of the state data from to a second format of the state data, wherein the second state data format is compatible with the upgraded second version of a control

Art Unit: 2191

application as the second controller assumes operational control of the system upon quiescence of the primary controller;

-operating the upgraded second version of a control application to control the system, wherein the second version utilizes the converted second version of the state data to ensure stability.

(See rejection of limitations as addressed in claim 1 above. Claim 14 more broadly has the limitation of "the system" in comparison to "wireless communications system" of claim 1. The Holte-Rost invention is not limited to a wireless system, thus the reference is applicable as prior art.)

Per claim 15:

A checkpointing method of stabilizing a system during a downgrade of services, the system having a primary controller comprising a first version of a control application, a secondary controller comprising a replicated first version of a control application, and a checkpointing service, the method comprising the steps of:

-operating the first version of a control application by the primary controller so that the primary controller has operational control of the system;

-saving state data in a first format,

-wherein the state data is representative of a stable operation of the system, and wherein the first format of the state data is compatible with the first version of a control application;

-utilizing the checkpointing service to save the first format of the state data to the secondary controller; -downgrading the replicated first version of a control application on the second controller to create a downgraded second version of a control application;

Art Unit: 2191

- converting the saved first format of the state data to a second format of the state data, wherein the second format of the state data is compatible with the downgraded second version of a control application;
- quiescing the primary controller;
- operating the downgraded second version of a control application on the second controller after quiescing the primary controller so that the second controller assumes operational control of the system upon shutdown of the primary controller;
- operating the second version of a control application to operationally control the system, wherein the second version utilizes the converted second version of the state data to ensure stability.

(See rejection of limitations as addressed in claim 6 above. Claim 15 more broadly presents the limitation of "the system" in comparison to "wireless communications system" of claim 6. The Holte-Rost invention is not limited to a wireless system)

5. Claims 2, 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,101,327 to Holte-Rost et., in view of US Patent 6,463,584 B1 to Gard et al., and further in view of US Patent 5,666,293 to Metz et al.

Per claim 2:

Art Unit: 2191

A method as defined in claim 1, wherein the wireless communication system further has a version control table containing the version number for the first version of a control application on the primary controller and the replicated first version of a control application.

Holte-Rost / Gard is certainly aware that differing versions exist. Holte-Rost disclosed (col. 4, lines 25-26, "The present invention provides a mechanism to identify which software version is to be used during system upgrade..." Holte-Rost / Gard failed to specifically disclose a "version control table containing the version number or the first version of a control application and the second version of a control application."

However, Metz disclosed (col. 36, lines 31-36) "The DET microprocessor 110 examines the data in the network table (version table) associated with the particular type of set-top to identify the current operating system version number being broadcast for the particular type and/or model of set-top terminal. The system memory 120 also stores a version number for the operating system the DET microprocessor 110 is currently running. The DET microprocessor 110 compares the operating system version number in the network table with the operating system version number stored in its associated system memory 120 to determine whether or not they match. If they match, an operating system upgrade is not necessary at this time,

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost / Gard by including more details regarding a version table and comparison of version numbers as disclosed by Metz, because all references refer to

Art Unit: 2191

downloading / updating / upgrading operating system software in a reliable and secure manner (Metz, col. 4, lines 34-35) (Holte-Rost, col. 3, lines 23-24) (Gard, col. 3, lines 53-56), ensuring compatibility, thus allowing for changes in versions as desired.

Per claim 3:

A method as defined in claim 2, wherein the step of upgrading the replicated first version of a control application on the second controller thereby creating an upgraded second version of a control application further comprises the steps of -updating the version control table with the new version number of the upgraded second version of a control application;
-comparing the version number for the replicated first version of a control application on the secondary controller to the version number. for the upgraded second version of a control application on the secondary controller to determine the upgraded second version of a control application has been upgraded.

Holte-Rost / Gard is certainly aware that differing versions exist. Holte-Rost disclosed (col. 4, lines 25-26, "The present invention provides a mechanism to identify which software version is to be used during system upgrade..." Holte-Rost / Gard failed to specifically disclose a "version control table containing the version number or the first version of a control application and the second version of a control application."

However, Metz disclosed (col. 36, lines 31-36) "The DET microprocessor 110 examines the data in the network table (version table) associated with the particular type of set-top to identify the

Art Unit: 2191

current operating system version number (comparing the version number. . . to determine whether the second version has been upgraded) being broadcast for the particular type and/or model of set-top terminal. The system memory 120 also stores a version number for the operating system the DET microprocessor 110 is currently running. The DET microprocessor 110 compares the operating system version number in the network table with the operating system version number stored in its associated system memory 120 to determine whether or not they match. If they match, an operating system upgrade is not necessary at this time."

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Holte-Rost / Gard, by including more details regarding a version table and comparison of version numbers as disclosed by Metz, because all references refer to downloading, updating, upgrading operating system software in a reliable and secure manner (Metz, col. 4, lines 34-35) (Holte-Rost, col. 3, lines 23-24) (Gard, col. 1, lines 53-56), ensuring compatibility, thus allowing for changes in versions as desired.

Per claim 7:

A method as defined in claim 6, wherein the wireless communication system further has a version control table containing the version number for the first version of a control application and the replicated first version of a control application on the secondary controller.

(See rejection of limitations as addressed in claim 2 above.)

Per claim 8:

Art Unit: 2191

A method as defined in claim 7, wherein the step of downgrading the replicated first version of a control application on the secondary controller thereby creating an downgraded second version of a control application further comprises the steps of updating the version control table with the new version number of the downgraded second version of a control application; and comparing the version number for the replicated first version of a control application on the secondary controller to the downgraded second version of a control application on the secondary controller to determine the downgraded second version of a control application has been downgraded.

(See rejection of limitations as addressed in claim 3 above.)

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached at (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned: 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

Art Unit: 2191

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman



04/27/2006